National Engineering Laboratory

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Case Study:
Getting the Right Measure

Coriolis Flow Meter Selection Study

TÜV SÜD National Engineering Laboratory was commissioned by a North Sea operator to upgrade its offshore metering system, as the existing system had become inadequate due to the challenging process conditions . Using its knowledge of commercial Coriolis metering systems and its understanding of the impact of elevated operating conditions on meter performance, TÜV SÜD National Engineering Laboratory re designed the metering system for the operator.

OVERVIEW	
Client name	Confidential
Industry	Oil & Gas

Issue

The operator's existing metering system had been deemed inadequate for fiscal and allocation measurement purposes. TÜV SÜD National Engineering Laboratory was approached to select the best Coriolis metering solution for high temperature applications. The design was made more challenging due to the complex installation conditions and low fluid velocity.
The selection process was necessary because the existing Coriolis flow meter was over-sized and not installed in the optimum location. There was also the issue of operating at elevated process conditions without any validation via a traceable flow calibration.

Approach

Having established the process conditions in the field, TÜV SÜD National Engineering Laboratorycarried out a review of the installation and its obligatory reporting requirements. A large number of flow meter manufacturers were then contacted to determine the uncertainty of their meters at elevated process conditions. A cost-benefit analysis was then carried out to balance costs against performance.

Solutions

Using its comprehensive understanding of the Coriolis technologies on the market, and its knowledge of the factors that affect uncertainty, TÜV SÜD National Engineering Laboratory selected a Coriolis flow meter that provided a high level of accuracy across the operating range found at the client's field. To further enhance measurement accuracy, TÜV SÜD National Engineering Laboratory utilised computational fluid dynamics (CFD) to design the optimum installation location. The design minimised installation effects to avoid swirl and other disturbances that could have had negative influences on the measurement uncertainty.

Benefits

By assessing the different Coriolis meters on the market, an optimal solution was derived for the operator's challenging application. To avoid mis-measurement, the most appropriate Coriolis flow meter was selected. The implications of selecting the wrong meter would have been significant for the client. TÜV SÜD National Engineering Laboratory's research has shown that even nominal increases in temperature and pressure can lead to significant Coriolis meter errors.

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